The "Sample Information" section of the report contains the sample identifier and waste code submitted on the *Waste Sample Information* form.

The "Laboratory Results" section of the waste report list concentrations of essential plant nutrients and some potentially harmful elements in units of parts per million. For composted materials, a pH is determined along with carbon, C:N ratio and electrical conductivity or soluble salts (SS). These values can prove useful when blending composted wastes into potting soils. An agricultural lime equivalent (ALE) is calculated for waste products that may have neutralizing value and indicates the amount of the waste (on a wet basis) that must be applied to have the same effect as one ton of agricultural lime.

The "Nutrients Available for First Crop" section estimates the amount of each nutrient available to the first crop grown after waste application. These amounts are predicted based on estimates of mineralization rate and nutrient loss for the application method.

The "Other Elements" section of the report lists amounts of some potentially harmful elements that growers may want to monitor—such as sodium, nickel, cadmium and lead.

The "Recommendations" section provides general information on the waste product, including attention to unusual quantities of heavy metals and other qualities that could have a bearing on environmentally sound disposal. For diagnostic samples, site-specific recommendations are provided based on background information.

Monitoring & Record Keeping

Growers who use wastes as fertilizer benefit from maintaining accurate records of their activities, including waste analysis reports, application rates and dates, and crop sites. Records of annual or biennial soil tests provide evidence that soil pH and fertility have been maintained properly and are in line with the applications made. Plant analysis reports indicate crop response to the material applied and, in some cases, provide evidence needed to justify increases in application rates to maximize production. Yield and quality records complete the picture of production trends.

Be conscientious. Sample both surface and ground water annually to be sure the waste application program is not having a negative impact on the environment. Over time, records of analytical results may prove to be invaluable indicators of responsible waste management and environmental stewardship.

For additional information, contact

NCDA&CS Agronomic Division
Colleen M. Hudak-Wise, Ph.D., Director

Plant/Waste/Solution Section
Brenda R. Cleveland, Section Chief

Physical Location:
4300 Reedy Creek Road
Raleigh, NC 27607-6465

Mailing Address:
1040 Mail Service Center
Raleigh, NC 27699-1040

Phone: (919) 733-2655

or visit our Web site
www.ncagr.com/agronomi

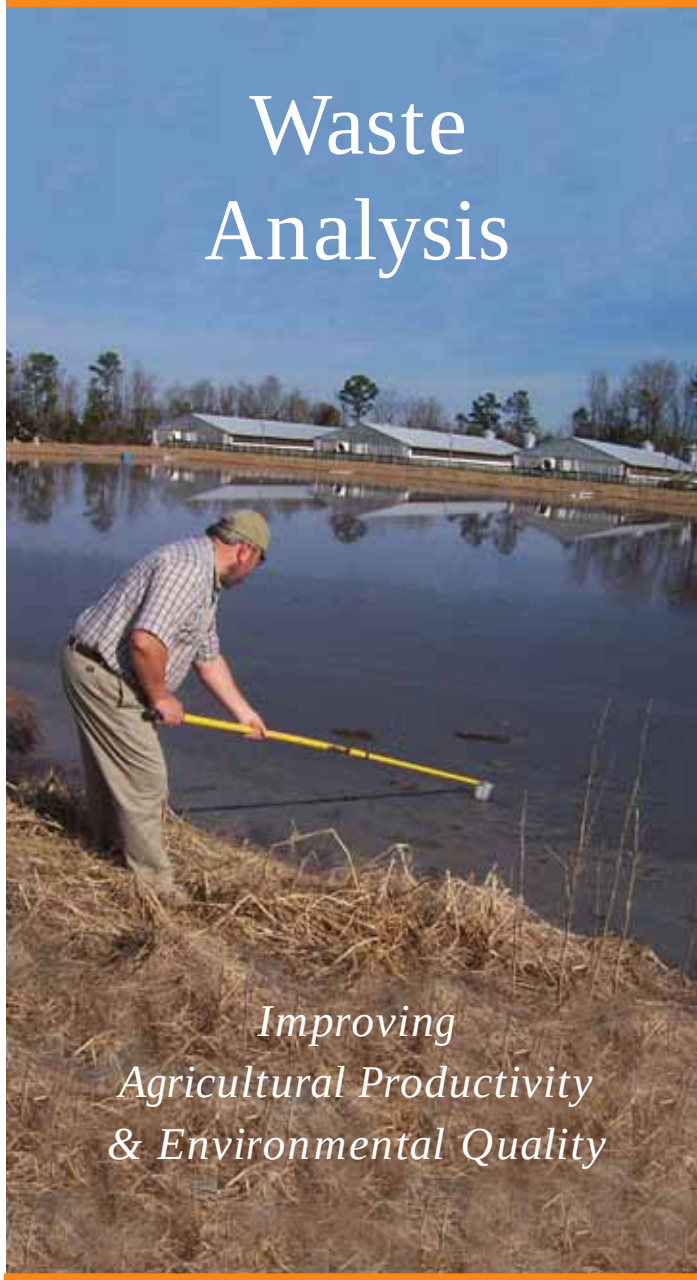
Prepared by
Brenda R. Cleveland, Michelle McGinnis
and Catherine E. Stokes

revised October 2007

2,500 copies of this public document were printed
at a cost of $256.09 or $0.10 per copy.

Agronomic Division

Waste Analysis



N.C. Department of Agriculture and Consumer Services

Steve Troxler, Commissioner

North Carolina disposes of a large and varied amount of waste annually. Food production and processing industries, wood processing and paper mills, textile and furniture manufacturers, pharmaceutical companies, municipalities and farm operations all generate organic by-products, generally referred to as waste.

Not too long ago, industrial and municipal wastes went primarily into landfills. As concern about potential environmental contamination and demand for landfill space has increased, more wastes have been applied to agricultural land for their fertilizer value. This is a safe and appropriate use for most materials as long as they are applied at agronomic rates and according to best management practices.

Farmers have long recognized the benefits of using waste materials to grow crops. Organic residues, such as animal manures and crop residue, represent a valuable fertilizer resource. They often provide the full complement of nutrients required for plant growth as well as enhance the physical properties of soil. N.C. livestock and poultry operations generate enough waste each year to meet much of the state's fertilizer needs (Table 1).

Table 1. Average plant nutrients available the first year after broadcast application of animal waste*

	N	P_2O_5	K_2O
	lb/ton		
Broiler House Litter > 11,000 samples	29.0	26.8	40.0
Turkey House Litter > 4,000 samples	24.2	28.0	26.6
	lb/1000 gallons		
Anaerobic Swine Lagoon > 93,000 samples	1.8	1.0	5.4
Dairy Manure Slurry > 3,000 samples	4.6	4.2	9.7

* Data are based on waste analyses conducted 1999 to 2006.

NCDA&CS Waste Analysis

Waste analysis is an inexpensive and accurate way to measure fertilizer value. For maximum safety and efficacy, always analyze waste materials before application. Never rely on *average* nutrient values (as in Table 1). Since nutrient levels vary greatly over time and between operations, get an accurate analysis of the specific material at the time it is to be used.

The Agronomic Division's Plant, Waste and Solution Section analyzes liquid and solid waste samples and issues reports that provide detailed information on nutrient content and other relevant chemical properties. Agronomists provide advice about appropriate agronomic use of waste products and help growers interpret waste report results.

Waste analysis measures the concentrations of essential plant nutrients in each sample—nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, zinc, copper and boron plus sodium. Other analyses, including pH, soluble salts, carbon and % dry matter, are only performed on specific types of waste materials.

Certain additional analyses are provided only by special request. For example, municipal and industrial wastes are often tested for heavy metal content (cadmium, lead, nickel) and agricultural lime equivalent (ALE) or calcium carbonate percentage. Nitrogen breakout information (NO_3-N, NH_4-N, urea) is often performed on research samples.

Submitting a Representative Sample

Proper sampling is the key to reliable waste analysis. Laboratory procedures provide accurate analysis but cannot compensate for samples that do not represent the waste product. Additionally, a representative sample is important because only a very small portion of the sample is analyzed in the laboratory.

For a good, representative sample, collect waste from eight to ten locations within the source and mix it all together in a suitable container. Collect your sample from this mixture. Sampling methods vary according to waste types, treatment and storage facilities. For details, visit www.ncagr.com/agronomi/pdffiles/samwaste.pdf.

Since nutrient concentrations change over time, collect and submit waste samples as close to the time of application as possible. Analytical results from previous years have minimal value.

Rainfall and ambient air pressures can alter nutrient levels in an anaerobic lagoon. Likewise, stockpiled litter or other wastes change significantly if left unprotected. The composition of municipal and industrial wastes varies with production demands that alter inputs and processing.

Waste Sample Information (form AD-9) is available on the Division's Web site. It must accompany all samples and be filled out in as much detail as possible. Samples must be submitted in the client's name for easy information retrieval.

Five samples may be listed per form. ***The shaded areas of the information sheet must be completed before samples can be processed.*** Take special care to choose the correct codes for waste type and application method. The report can provide estimates for two different application methods.

Understanding the Waste Report

Clients receive reports in the mail but can also access them online by selecting **Find Your Report** from the left navigation bar on the Agronomic Division's Web site at www.ncagr.com/agronomi. Reports come with an explanatory cover sheet, but additional help in interpreting the results and recommendations is available, if necessary, from NCDA&CS regional agronomists.